Perkins Eastman

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MARTIN LUTHER KING, JR. SCHOOL CONSTRUCTION PROJECT
SPECIAL PERMIT SUBMISSION – 03.21.2013

Owner

City of Cambridge

City Hall
795 Massachusetts Ave.
Cambridge, MA 02139
617.349.4300

Construction Manager

Rich-Caulfied,
MLK Venture

29 Crafts St., Suite 300
Newton, MA 02458
617.467.6010

Structural Engineer

Foley Buhl Roberts &
Associates, Inc.

2150 Washington St.
Newton, MA 02642
617.527.9600

MEP / FP

AKF Group LLC

41 Farnsworth St.,
3rd Floor
Boston, MA 02210
617.737.1111

Civil / Survey / Traffic

Nitsch Engineering, Inc.

2 Center Plaza, Suite 430
Boston, MA 02108
617.338.0063

Landscape Architect

Brown Sardina

129 South St.
Boston, MA 02111
617.482.4703

Technology / Security

Garcia, Galuska,
DeSousa, Inc.

370 Faunce Corner Rd.
Dartmouth, MA 02747
508.998.5700

Acoustics / AV

Acentech

33 Moulton St.
Cambridge, MA 02138
617.499.8000

Net Zero Energy

InPosse

1500 Walnut St.,
Suite 1414
Philadelphia, PA 19102
215.282.6800

Lighting Design

Lam Partners

84 Sherman St.
Cambridge, MA 02140
617.354.4502

Specifications

Architx, LLC

64 Hartford Tpke.
Tolland, CT 06084
860.872.9627

Community Outreach

Boyes-Watson Architects

30 Bow St.
Somerville, MA 02143
617.629.8200

CITY OF CAMBRIDGE, MASSACHUSETTS

PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

SPECIAL PERMIT APPLICATION • COVER SHEET

In accordance with the requirements of the City of Cambridge Zoning Ordinance, the undersigned hereby petitions the Planning Board for one or more Special Permits for the premises indicated below.

Location of Premises:	100 Putnam Avenue		
Zoning District:	C-1		
Applicant Name:	City of Cambridge		
Applicant Address:	795 Massachusetts Avenue 02139		
Contact Information:	617-349-4251	mblack@cambridgema.gov	n/a
	Telephone #	Email Address	Fax #

List all requested special permit(s) (with reference to zoning section numbers) below. *Note that the Applicant is responsible for seeking all necessary special permits for the project. A special permit cannot be granted if it is not specifically requested in the Application.*

Article 5.54: Special Regulations for Municipal Elementary and Middle ("K-8") Schools,
Special Permit requested for Height and for Gross Floor Area.
Request waiver of Special Permit Fee for City Project

List all submitted materials (include document titles and volume numbers where applicable) below.

Drawings per "List of Drawings", Cover Sheet, Ownership Certificate, Dimensional Form, Project Narrative, Sustainability Appendix,
Traffic Impact Study / PTDM Plan /Tree Study submitted previously

Signature of Applicant: Robert W. Healy

For the Planning Board, this application has been received by the Community Development Department (CDD) on the date specified below:

Date Signature of CDD Staff

OWNERSHIP CERTIFICATE

Project Address: 100 Putnam Avenue **Application Date:** 3/21/13

This form is to be completed by the property owner, signed, and submitted with the Special Permit Application:

I hereby authorize the following Applicant: City of Cambridge

at the following address: 100 Putnam Avenue

to apply for a special permit for: Martin Luther King Jr. School Construction Project

on premises located at: 100 Putnam Avenue

for which the record title stands in the name of: City of Cambridge

whose address is: 795 Massachusetts Avenue

by a deed duly recorded in the: 11742 589
11529 547

Registry of Deeds of County: Book: 3439 Page: 439

OR Registry District of the Land Court, Certificate No.: Book: n/a Page: n/a

Robert W. Healy

Signature of Land Owner (If authorized Trustee, Officer or Agent, so identify)

Robert W. Healy City Manager

To be completed by Notary Public:

Commonwealth of Massachusetts, County of Middlesex

The above named Robert W. Healy personally appeared before me,

on the month, day and year March 19, 2013 and made oath that the above statement is true.

Notary: Maryellen Carvello

My Commission expires:

MARYELLEN CARVELLO
Notary Public
Commonwealth of Massachusetts
My Commission Expires October 10, 2014

DIMENSIONAL FORM

Project Address: **100 Putman Ave - MLK School** **Application Date:** **3.21.13**

	Existing	Allowed or Required (max/min)	Proposed	Permitted
Lot Area (sq ft)	147,534	5,000	Unchanged	
Lot Width(ft)	See site plan	50'	Unchanged	
Total Gross Floor Area (sq ft)	153,736	184,418 (5.54.2 w Sp. Permit)	173,000	
Residential Base	n/a	n/a	n/a	
Non-Residential Base	n/a	n/a	n/a	
Inclusionary Housing Bonus	n/a	n/a	n/a	
Total Floor Area Ratio	1.04	1.25	1.17	
Residential Base	n/a	n/a	n/a	
Non-Residential Base	n/a	n/a	n/a	
Inclusionary Housing Bonus	n/a	n/a	n/a	
Total Dwelling Units	n/a	n/a	n/a	
Base Units	n/a	n/a	n/a	
Inclusionary Bonus Units	n/a	n/a	n/a	
Base lot Area / Unit (sq ft)	n/a	n/a	n/a	
Total Lot Area / Unit (sq ft)	n/a	n/a	n/a	
Building Height(s) (ft)	50'	55'/65' w/ Sp. Permit	63	
Front Yard Setback (ft)	see Topographic Plan of Land	10' min.	see Zoning Analysis Site Plan	
Side Yard Setback - Side? (ft)	see Topographic Plan of Land	15'	see Zoning Analysis Site Plan	
Side Yard Setback - Side? (ft)	see Topographic Plan of Land	15'	see Zoning Analysis Site Plan	
Rear Yard Setback (ft)	see Topographic Plan of Land	n/a	see Zoning Analysis Site Plan	
Open Space (% of Lot Area)	n/a	n/a	n/a	
Private Open Space	0	0	0	
Permeable Open Space	n/a	n/a	n/a	
Other Open Space (Specify)	n/a	n/a	n/a	
Off-Street Parking Spaces	39	39	45/75*	
Bicycle Parking Spaces	n/a	63 / 11 = 74**	64 / 11 = 75**	
Loading Bays	1	1	1	

Use space below and/or attached pages for additional notes:

* 45 complying spaces + 32 tandem spaces = 75 total parking spaces
(see Site Plan & Ground Floor Plan for location)

** 64 Short Term + 11 Long Term = 75 total bicycle parking spaces

PROJECT NARRATIVE

This is an application by the City of Cambridge for a Special Permit to allow for the replacement of the existing King / Amigos School structure with a new K-5 and a grade 6-8 school with an attached preschool at 100 Putnam Avenue, Cambridge. The proposal includes parking for 75 motor vehicles and 75 bicycles. The property is situated abutting Putnam Avenue, Kinnaird Street, Hayes Street and Magee Street in a C-1 District.

The project will involve the removal of the existing building, except for a portion of the basement that will form the parking for the new structure. There will be entrances on Putnam, Kinnaird and Magee Street as well as access across the playgrounds from Hayes Street. The new structure will consist of a three and four story building design totaling +/-173,000 square feet. Vehicular access to the property will continue to be from Kinnaird Street. Bus drop off and pick-up will be unchanged from the current pattern, which is that busses drop off on Putnam and pick up on Magee. All but 6 of the relocated parking spaces will be located out of sight in an underground garage. Both the surface spaces and the underground parking will be located off an existing curb cut on Kinnaird Street, which will also provide access to the loading dock as it does at the current facility.

The elimination of vehicles from most of the site means that the front yards of the lot can be extensively landscaped and provide gathering and play space opportunities for the children of the school and the abutting community.

In formulation of the proposed design, the design team, city staff and school department have engaged in an extensive outreach program to abutters, the neighboring community, the school community, and met extensively with teachers and staff. The engagement with neighbors and abutters commenced in the feasibility phase of the project in April, 2012. Community meetings continued during schematic design encompassing a total of seven meetings, included 2 meetings with direct abutters. Consultation has also included the Arts Council, and artists involved in the exterior mural. The Open Space committee was also consulted in February of 2013.

SUPPORTING STATEMENT FOR A SPECIAL PERMIT

Please describe in complete detail how you meet each of the following criteria referring to the property and proposed changes or uses which are requested in your application. Attach sheets with additional information for special permits which have additional criteria, e.g. fast food permits, comprehensive permits, etc., which must be met.

Granting the Special Permit requested for **the Martin Luther King Jr. School** would not be a detriment to the public interest because:

A) **Requirements of the Ordinances can or will be met for the following reason:**
The project meets the requirements of the zoning ordinance but requires the issuance of a special permit for the following:

1) Gross Floor Area. The project requires a special permit to exceed the floor area of the existing buildings on the lot pursuant to Art.5.54.2A. The project gross floor area remains less than the maximum allowed by special permit (Maximum floor area ratio allowed by SP is 1.25.)

2) Height: The reconstructed school requires a special permit to exceed the allowed 55' height limit for the lot pursuant to Art.5.54.2C A portion of the structure exceeds the 55' foot limit, and that portion is more than 50' from any lot line consist with the requirements of 5.54.2C.

B) **Traffic generated or pattern of access or egress would not cause congestion hazard or substantial change in established neighborhood character for the following reasons:**
Traffic - The project has been designed to follow the existing traffic patterns at the site, but includes roadway improvements on Magee, Putnam and Kinnaird that improve safety and functionality. As indicated on the Traffic Impact Study (TIS) draft submitted to Traffic & Parking on January 22, 2013 the project meets the Project Review criteria. The proponent is implementing an approved Parking and Transportation Demand Management plan as part of the project.

C) **The continued operation of or the development of adjacent uses as permitted in the Zoning Ordinance would not be adversely affected by the nature of the proposed use for the following reasons:**
Uses - A school was already operating at the site, and the new school maintains similar relationships to the surrounding residential uses.

D) **Nuisance or hazard would not be created to the detriment of the health, safety and/or welfare of the occupants of the proposed use or the citizens of the city for the following reasons:**
Replacement of the existing school with a new school will not introduce any nuisance or hazard.

E) **For other reasons, the proposed use would not impair the integrity of the district or adjoining district or otherwise derogate from the intent or purpose of this Ordinance for the following reasons:**
The new school replaces an existing school building and is consistent with the provisions and goals of the ordinance, including much improved energy performance.

MUNICIPAL K-8 SCHOOL RECONSTRUCTION 5.54.2 COMPLIANCE

Special Permit Criteria:

Preamble

A special permit is requested to waive the limitation of the gross floor area and to waive the height limitation of 55 feet.

The proposed reconstruction of the school has been designed to minimize or mitigate adverse impacts on neighboring residential properties as follows:

i) Arrangement of building height and bulk within the lot.

The building has been designed to improve the relationships to surrounding street and neighboring residential structures. On Putnam Avenue a courtyard has been created to breakdown the massing on the street. On Kinnaird, the building has been moved further from the street than the existing building, and the scale of the building steps down. At Hayes Street, the surface parking lot has been eliminated, and the building massing articulated to vary the heights. On Magee Street, the building carefully responds to the curve in the road, and the small gym breaks down the scale of the building and responds to the adjacent residential neighbors to the East. The design has been configured so that the highest portions of the building are located as far from the lot lines as possible.

ii) Access and egress for pedestrians, bicycles and motor vehicles, including pick-up and drop-off areas for buses and cars.

The access and egress to the school has been designed to maintain the existing patterns of drop off and pick up at the site and to improve functionality and safety where possible. On Putnam Avenue a new raised crosswalk is proposed opposite the new entry courtyard. At Kinnaird, the street is widened to facilitate parent drop-off without impeding traffic flow. On Magee the street is widened so that school busses can wait without impeding traffic, and the non-optimal right angle parking is eliminated in favor of a traditional curb line improving safety and functionality. Vehicular access to the site is maintained via Kinnaird, but although the total number of parking spaces is more or less equivalent to the number of spaces utilized at the existing school, all but six of the proposed parking spaces are located below grade, with access via an existing curb cut. This enables closing of one of the curb cuts on Kinnaird. Substantial bicycle parking is provided meeting the requirements of the Traffic and Parking Department, including in close proximity to all the building entries.

iii) Location and screening of functions such as parking, loading, trash handling, and mechanical equipment.

As discussed above, most of the surface parking has been eliminated and relocated in the existing school basement. The existing loading dock location is maintained, and is screened similarly to the existing condition by its location and the site topography, as is the proposed trash storage, which is also maintained in a similar location to that of the existing school. Minimal amounts of mechanical equipment are located on the building roofs and are visually and acoustically screened.

ARTICLE 19 SPECIAL PERMIT COMPLIANCE

19.30 ***Citywide Urban Design Objectives***

19.31 ***New projects should be responsive to the existing or anticipated pattern of development:***

(1) *Heights and setbacks*

The new building is designed so that the height and setbacks of the building respond to abutting residential structures and streets. Where additional height is required, it is located at the center of the site.

(2) *Consistency with existing streetscape*:

The building responds to the specific conditions of the streets that it abuts. On Putnam Avenue, the building in a conventional relationship to the street for a residential C-1 zone, where the minimum 10' setback pertains. The courtyard that leads to the school entrances breaks up the mass of the building as it presents to Putnam. On Kinnaird, the building is designed to recede from the street and present a significant area of new trees and landscaping and replaces the unsightly parking that used to directly abut the street. A curb relocation improves the ability of traffic to flow past vehicles that are dropping off children, while providing more on street parking at non drop off times. At Hayes Street, the elimination of the parking means that the playgrounds separate the school from the street down the entire East side of the site. At Magee Street, the school respects the typical 10' Res C-1 setback, while the geometry of the new school carefully responds to the curve in the street. The curb lines of the street have been reconfigured for safer bus pick-up and traffic circulation, including the elimination of problematic end-on parking at the south side of the street.

(3) *Mixed Use Projects*:

n/a.

(4) *Respect for historical context*

Although the existing building on the site is in the process of being removed, the replacement building respects the historical precedents regarding site design and pedestrian movement.

19.32 ***Development should be pedestrian and bicycle-friendly, with a positive relationship to its surroundings.***

(1) Ground floor active uses etc.

All school entrances are designed to be both bicycle & pedestrian friendly. There are bicycle storage facilities at all the entrances, and building entry points at each street respond to the pedestrian flows to and from the school.

(2) *Covered parking*

Almost all surface parking has been eliminated (only 6 spaces remain) and the remaining spaces are now located in a reused portion of the existing school basement. This enables the removal of large areas of impervious surface, and landscaping and play spaces replace almost all the surface parking previously visible from Kinnaird.

(3) *Ground floor transparency*

The fenestration of the school responds to the specific light needs of the school spaces within in such a way as to maximize positive day lighting for classrooms while minimizing energy consumption, providing varied and articulated street facades.

(4) *Entries and pedestrian movement*

The building responds to the desired access lines of pedestrians and cyclists accessing the school from the multiple streets that abut it. In addition to providing multiple access points to the building from surrounding streets, the forecourt on Putnam is a specific response to the need to provide a pedestrian "anteroom" for the main entrance to the school.

(5) *Pedestrian and bicyclists' access, and safe bicycle storage*

The project is designed to provide a safe and convenient access to the project for cars, bicycles, and pedestrians in a manner consistent with local street patterns and prior usage and to help integrate the building into surrounding streetscapes.

For vehicles accessing the site parking, this means continuing to use Kinnaird Street, which will also continue to be used for child drop off by parent in vehicles. Bus drop off will be on Putnam, where widening of the sidewalk and the provision of a generous landscaped courtyard will better accommodate the use. Hayes Street will continue to provide access for pedestrians and cyclists. At Magee Street it is proposed to realign and replace curb to simplify traffic patterns and better support the bus pick up that will continue to occur at the south entry door. For Pedestrians: Each of the four streets lead to school entrance points, and the school playground to the east continues to link Kinnaird, Hayes and Magee Street with a pedestrian friendly route. The design and grading of the path up to Magee has been improved to meet current accessibility standards. Sidewalks at Kinnaird, Magee and Putnam are all modified to improve usability and safety. For Bicyclists: The project proposes substantial on-site bicycle parking, covered bicycle parking in the parking garage, and bicycle parking convenient to each building entry point.

(6) *Alternate means of serving this policy*

n/a.

Section 19.33: ***The building and site design should mitigate adverse environmental impacts of a development upon its neighbors.***

(1) Mechanical equipment that is carefully designed, well organized or visually screened from its surroundings and shall be acoustically buffered from neighbors:

The school is targeting a Net Zero Energy design and almost all of the roof will be covered with PV's (Photovoltaics). Accordingly, the majority of mechanical HVAC equipment will be located indoors and within dedicated rooms on the lowest level of the facility in an effort to mitigate adverse environmental impacts upon neighbors. A limited quantity of mechanical HVAC equipment will be located outdoors at roof level. This equipment will be located and sited to minimize visual and acoustical impacts upon neighbors. Garage exhaust fans and transformer vault fan will be provided with discharge sound attenuation devices to acoustically buffer from neighbors. No at-grade mechanical HVAC equipment will be provided.

(2) Location and operation of trash storage and removal systems:

Trash areas are concealed from view from the street and are located adjacent to the loading dock.

(3) *Location and operation of loading facilities:*

The loading dock is in the same location as for the current school, off Kinnaird Street, and is concealed from street view. The facility is significantly below street grade at Kinnaird which helps conceal it from view and mitigate noise.

(4) *Stormwater Best Management Practices and other measures to minimize runoff and improve water quality will be implemented:*

The site drainage will be designed to meet the provisions of the MassDEP Stormwater Management Policy for a redevelopment project. Stormwater management strategies for the proposed building and site improvements will seek to mitigate the stormwater runoff as required by the City of Cambridge standards and standard engineering practices of the State of Massachusetts. Proposed mitigation measures include the use of Cambridge-approved Best Management Practices ("BMP's"), including possible underground detention/infiltration systems, proprietary water quality management structures, and a rainwater collection/reuse cistern. Rainwater collected from the rooftops of the proposed building will be directed into the rainwater reuse cistern and any overflow will be routed to the drainage system in Kinnaird Street.

During construction, standard engineering practices for erosion and sedimentation control will be implemented on site. A Stormwater Pollution Prevention Plan ("SWPPP") will be prepared for the site per the requirements of the United States Environmental Protection Agency ("US EPA") National Pollutant Discharge Elimination System ("NPDES") Construction General Permit ("CGP") as project construction will disturb more than one acre. The SWPPP will also be used to document compliance with the Leadership in Energy and Environmental Design ("LEED") Sustainable Sites Prerequisite for Erosion and Sedimentation Control

(5) *Landscaped areas to mitigate run-off:*

Where possible, site stormwater will be directed into porous landscaping surfaces to promote increased infiltration. Further, because a majority of the site currently drains to sewer systems which discharge to the combined sewer main in Western Avenue, the project intends to reroute drainage discharges to dedicated storm sewers to decrease the amount of stormwater flow being discharged to combined systems in the vicinity of the project site.

(6) *Shadow impacts*:

The bulk of the building is moved away from the north boundary line (Kinnaird Street) and closer to the south boundary line (Magee Street), reducing shadow impacts. The highest portions of the building are kept to the center of the site which also reduces shadow impacts.

(7) *Changes in grade*:

A concrete retaining wall exists and will remain along the rear property line of 90, 88 and 76 Putnam Avenue, which abut the school property and leads to the loading area and parking entrance. A short section of the existing retaining will be removed at the southern end and a new wall installed in a different configuration to tie into the new building. The existing wall will be extended to the north to mitigate a steep slope that currently exists on the site providing a flatter area to plant screening vegetation.

(8) *Building scale and wall treatment*: The mass is broken up by stepping forward and back to create bays and to reduce the length of the long facades to a size and scale in keeping with the neighborhood. The areas of window are carefully modulated to provide articulation to the building facades.

(9) Outdoor lighting is designed to provide minimum lighting and necessary to ensure adequate safety, night vision, and comfort, while minimizing light pollution:

All light fixtures will employ full cut-off optical systems to direct light downwards to eliminate light trespass issues with adjacent residences.

Building exterior lighting will provide for safe and pleasant arrival and entry into the School. There will be no conventional building façade lighting or decorative lighting elements. Site walkways will be illuminated with pole mounted fixture using LED sources with excellent color characteristics and light pollution control. By code, all means of egress will be lighted and with full cut-off fixtures to reduce glare and eliminate light trespass. Select landscape elements will be lighted carefully from low-intensity fixtures for visual interest and orientation. A lighting control system will manage light levels after normal operational hours and in some cases will automatically dim fixtures when areas are unoccupied, using sensing technologies to bring them back to full intensity when necessary.

The Putnam Avenue main entrance will feature a pair of post-top luminaires near the base of the stairs. Another pair will occur approximately in the middle of the upper entry courtyard. These fixtures will be comprised of a simple cylindrical pole with 2-3 adjustable LED heads; the intent being to create soft, glare-free pools of light along the stair, walking surfaces and outdoor gathering spaces. Select landscape elements (specimen trees, garden) within planted areas will be lighted from low-level, low-intensity LED fixtures. Streetlights will remain in their current location.

Entry via the upper level of 'King Street' and the bus drop-off occurs on Magee Street. A single multi-headed LED post-top luminaire strategically located within a planting area will be able to light the stair, ramp and bike rack. Streetlights along the school side of the street will need to be relocated.

On Kinnaird Street, A single post-top luminaire will provide safe light levels at the surface parking area; two more will continue down the ramp towards the loading dock and underground parking. The canopy over the garage entrance will contain recessed downlights to boost light levels at this critical area at night and help with daylight adaptation during the day. The lower level 'King Street' entry will be marked by two of the aforementioned multi-head LED post-top luminaires along the curving side of the walking surface. Utility poles with streetlights are located along the school side of Kinnaird Street. One of the utility poles will need to be relocated.

The three major components of the play area will be lighted by a gently curving arc of (4) multi-headed LED post-top luminaires: one near the northeast corner of the gymnasium, one roughly centered along the Hayes Street extension, one near the northeast corner of the smaller gymnasium, and the final one near the top of the ramp connecting to Magee Street. This layout will make sure the primary pedestrian path is adequately illuminated while still providing light to play areas.

(10) *Tree protection*: a tree protection plan has been submitted to the city arborist and is included as part of this application.

The protection of the trees is shown on the Site Demolition Plan and Tree Protection Plan where chain link construction fencing serves as the Tree Protection Fencing for the trees. A specification has been developed for the care of the trees before and during construction that requires that a Certified Arborist review and make recommendation for the care of the trees.

A tree study has been completed by the City Arborist. It had been determined that 365 caliper inches are proposed to be removed from the site. The Proposed Landscaping Plan indicates that 266 caliper inches will be installed at the site as part of the initial planting installation.

A Tree Hearing was held on March 7, 2013 to review the request to remove two (2) street trees along Putnam Avenue that will be in the way of construction. The hearing resulted in the approval to remove the (2) two street trees. The proposed Landscaping Plan anticipates that five (5) to seven (7) street trees will be installed along Putnam Avenue in this area.

19.34 Projects should not overburden the City infrastructure services, including neighborhood roads, city water supply system, and sewer system:

(1) The building and site design will be designed to make use of water-conserving plumbing where possible and to minimize the amount of stormwater runoff through the use of best management practices for stormwater management:

The following strategies and technologies will be employed in the plumbing design, which aid in water conservation:

- Low-flow plumbing fixtures in restrooms
- Rainwater Collection and Reuse Cistern to reduce toilet demands
- Reduced or eliminated irrigation by use of native, tolerant plant species

The proposed stormwater management system will be designed in a manner that will meet or exceed the provisions of the MassDEP Stormwater Management Policy for a redevelopment project and the requirements of the City of Cambridge Stormwater Policy. A complete, detailed analysis of the site drainage will be prepared by Nitsch Engineering for submittal to the City under the requirements of the DPW's Stormwater Control Permitting Program.

The proposed stormwater management system will generally consist of area drains and deep-sump, hooded catch basins, manholes, and underground pipes. A rainwater collection cistern and filtration system (located in the proposed parking garage) will capture and manage roof drainage for reuse within the building for toilet flushing. Water quality requirements will be met through site greening and proprietary water quality structures, as well as the rainwater collection/reuse system.

The proposed reuse cistern will collect stormwater runoff from the proposed roofs of the new building. The runoff from the roofs will be discharged directly to the rainwater cistern in the proposed parking garage. The rainwater collected in these cisterns will be reused for toilet flushing in the new building. Once the cistern fills to capacity, it will overflow to the underground conveyance pipes and out to City drainage systems in Kinnaird Street.

The soils on the site generally consist of a surface fill layer of varying composition and thickness under laid by marine clays and glacial till. Depending on the location of the sample, these fill materials consisted of a range from gravels to coarse and fine sands to organics and silts/clays. Each location returned samples with trace amounts of brick and asphalt fragments. In specific locations, thick fill bands of mainly sand and gravel were encountered, whereas in other locations, little or no fill was encountered but rather a thick layer of marine clay. As such, infiltration-type stormwater management practices may be difficult to employ except in specific locations of well-drained, thick layers of gravel and sand.

According to City of Cambridge GIS information, the combined sewers in Putnam Avenue and Magee Street, as well as the separated drainage system in Hayes Street, all discharge to a large combined sewer main in Western Avenue to the south of the site. As such, one of the overarching design intentions of the project will be to redirect as much stormwater flow as possible away from these older

combined systems and into the newer separated drainage main in Kinnaird Street. In addition, the proposed design "greens" the property by reducing the amount of impervious area on the project site through careful application of porous turf systems and landscape areas, which will provide a benefit from a stormwater quality and quantity perspective. Although site conditions do not readily support the use of infiltration as a stormwater control measure, the project team will continue to explore isolated locations which may support infiltration-type BMPs for further management of runoff and satisfaction of City of Cambridge and MassDEP requirements for quality and quantity of runoff. The project team will also continue its cooperation with the City of Cambridge DPW to define the final approach for the mitigation of site drainage.

(2) *The capacity and condition of drinking water and wastewater infrastructure systems are shown to be adequate, or the steps necessary to bring them up to an acceptable level are identified:*

Based on conversations with the Cambridge Water Department "CWD", there are typically no water capacity issues in the vicinity of the project site in this part of Cambridge. Hydrant flow tests will be performed to determine the capacity of the water mains in Putnam Avenue and Magee and Hayes Streets. Should it be determined that there is inadequate pressure to provide the required flows, a booster pump will be added to the project to handle the deficiency.

The proposed school is expected to require approximately **14,000 gallons per day** for its domestic water demand based on Title V estimates and an assumed 10% increase due to consumption. The rainwater collection cisterns will be used to supplement the toilet demand reducing the actual demand on the municipal water system. The project's service connections will be from the existing the 16-inch water main in Putnam Avenue with an 8-inch loop through the property, connecting to both an existing 8-inch main in Magee Street and 6-inch main at the end of Hayes Street. A redundant water supply system will be provided for the building. Details of the redundant system will be coordinated with the CWD.

The building domestic water and fire protection service connections will be appropriately sized for the building. For the current design the installation of a 6-inch, ductile iron, potable water connection and an 8-inch, ductile iron, fire protection connection are being anticipated for the building at two locations. The connections to the existing mains are anticipated to be with the installation of new tee fittings or tapping sleeves and new valves, and will be fully coordinated with the CWD. The fire protection engineer will coordinate the fire protection design with the City of Cambridge Fire Department.

Based on discussions with the City of Cambridge DPW, the capacity and condition of the sewer mains in Kinnaird Street are known to be adequate and in good condition. Existing systems in Magee and Hayes Streets are older, as are those within Putnam Avenue. These latter systems all discharge to combined sewers in Western Avenue, and a part of the project's design intention is to redirect a portion of the sewerage flow from these older systems to the dedicated sanitary sewer in Kinnaird Street. The project sewerage service locations will continue to be discussed and reviewed with the City of Cambridge DPW.

(3) *Buildings are designed to use natural resources and energy resources efficiently in construction, maintenance, and long-term operation of the building, including supporting mechanical systems that reduce the need for mechanical equipment generally and its location on the roof of a building specifically. The buildings are sited on the lot to allow construction on adjacent lots to do the same. Compliance with Leadership in Energy and Environmental Design (LEED) certification standards and other evolving environmental efficiency standards is encouraged*:

The Martin Luther King Junior School is pursuing a Net Zero Energy Goal with a minimum of LEED Silver Certification. The project is currently tracking 75 points in the YES column with 27 study credits in the MAYBE column. Further study over the coming weeks and months will determine final credit achievement. We have outlined in the Sustainability narrative and LEED Checklist, included in this

submission, how the project intends to achieve the prerequisites and credits for the LEED for Schools 2009 Silver Certification.

19.35 New construction should reinforce and enhance the complex urban aspects of Cambridge as it has developed historically.

(1) *Campus*:

n/a

(2) *Institutional construction in commercial areas*

n/a

19.35.3 *Large, multiple building developments*

n/a

***19.35.4 Historic structures*:**

There are no buildings older than 50 years at the site: n/a

19.35.5 *Preservation for start-up companies*

n/a

19.36 Expansion of the inventory of housing in the city is encouraged.

19.36.1&2 n/a

19.37 Enhancement and expansion of open space amenities in the city should be incorporated into new development in the city.

(1) *Large parcel commercial developments*;

n/a

(2) *Enhance or expand existing open space facilities*:

The design provides school related play areas and networks for pedestrians and bicycles: The school related play areas have been expanded from 43,000 to 58,500. These play areas serve the school during school hours and for other school functions and are also made available to the community during non-school hours.

The entrance to the play area to the rear (west) from Magee Street at the current school has grades exceeding 5% and it is not accessible. The current site plan provides paved areas less than 5% and 2% cross slope and ramps to comply with ADA and MAAB requirements making the site fully accessible.

Wider walkways than are currently available at Putnam, Kinnaird and Magee streets are proposed to facilitate pedestrian movement. Bicycle racks are provided at all entrances to the school. Further discussion about bicycle parking can be found in the Traffic Impact Study.

Although there are no zoning requirements for the provision of open space for a school use on the lot, the design has accomplished an increase in useable school related play areas and green space over the current school.

(3) Wider range of open space opportunities:

n/a

Special Permit Narrative – Sustainability

I. PROJECT INTRODUCTION

The Martin Luther King Junior School is pursuing a Net Zero Energy Goal with a minimum of LEED Sliver Certification. The project is currently tracking 75 points in the YES column with 27 study credits in the MAYBE column. Further study over the coming weeks and months will determine final credit achievement. We have outlined, in the narrative below, how the project intends to achieve the prerequisites and credits for the LEED for Schools 2009 Certification.

II. LEED 2009 NEW CONSTRUCTION FOR SCHOOLS CHECKLIST

LEED 2009 for Schools New Construction and Major Renovations

Project Checklist

MLK Jr. School

######

Y	?	N			
15	7	2	**Sustainable Sites**	**Possible Points:**	**24**
Y			Prereq 1	Construction Activity Pollution Prevention	
Y			Prereq 2	Environmental Site Assessment	
1			Credit 1	Site Selection	1
4			Credit 2	Development Density and Community Connectivity	4
1			Credit 3	Brownfield Redevelopment	1
4			Credit 4.1	Alternative Transportation—Public Transportation Access	4
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Roon	1
2			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Ve	2
	2		Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1
		1	Credit 9	Site Master Plan	1
1			Credit 10	Joint Use of Facilities	1
4	7		**Water Efficiency**	**Possible Points:**	**11**
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4
	1		Credit 3	Process Water Use Reduction	1
30	3		**Energy and Atmosphere**	**Possible Points:**	**33**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
19			Credit 1	Optimize Energy Performance	1 to 19
7			Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
	1		Credit 4	Enhanced Refrigerant Management	1
2			Credit 5	Measurement and Verification	2
	2		Credit 6	Green Power	2
4	4	5	**Materials and Resources**	**Possible Points:**	**13**
Y			Prereq 1	Storage and Collection of Recyclables	
		2	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 2
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Element	1
2			Credit 2	Construction Waste Management	1 to 2

Y	?	N			
		2	**Materials and Resources, Continued**		
		2	Credit 3	Materials Reuse	1 to 2
1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1
14	4	1	**Indoor Environmental Quality**	**Possible Points:**	**19**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
Y			Prereq 3	Minimum Acoustical Performance	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
4			Credit 4	Low-Emitting Materials	1 to 4
	1		Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
3			Credit 8.1	Daylight and Views—Daylight	1 to 3
	1		Credit 8.2	Daylight and Views—Views	1
1			Credit 9	Enhanced Acoustical Performance	1
	1		Credit 10	Mold Prevention	1
5	1		**Innovation and Design Process**	**Possible Points:**	**6**
1			Credit 1.1	Inovation in Design: Education Plan	1
1			Credit 1.2	**Innovation in Design: Ex Perform. EA c1**	1
1			Credit 1.3	Innovation in Design: Ex Perform. EA c2	1
1			Credit 1.4	Innovation in Design: Ex Perform SSc10	1
1			Credit 2	LEED Accredited Professional	1
	1		Credit 3	The School as a Teaching Tool	1
3	1		**Regional Priority Credits**	**Possible Points:**	**4**
1			Credit 1.1	Regional Priority:EA c2	1
1			Credit 1.2	Regional Priority: SS c3	1
	1		Credit 1.3	Regional Priority: SS 7.1	1
1			Credit 1.4	Regional Priority: SS 7.2	1
75	27	8	**Total**	**Possible Points:**	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

II. LEED EXPLANATORY NARRATIVE FOR THE MARTIN LUTHER KING JUNIOR SCHOOL

A. Sustainable Sites

SSp1 - Construction Activity Pollution Prevention

Required
The design documents for Martin Luther King Junior School contain an erosion and sedimentation plan that conforms to local codes and the EPA Construction General Permit (Phase I and Phase II) of the National Pollution Discharge Elimination System Program NPDES.

During construction, standard engineering practices for erosion and sedimentation control will be implemented on site. A Stormwater Pollution Prevention Plan ("SWPPP") will be prepared for the site per the requirements of the United States Environmental Protection Agency ("US EPA") National Pollutant Discharge Elimination System ("NPDES") Construction General Permit ("CGP") as project construction will disturb more than one acre. The SWPPP will also be used to document compliance with the Leadership in Energy and Environmental Design ("LEED") Sustainable Sites Prerequisite for Erosion and Sedimentation Control

SSp1 – Environmental Site Assessment
Required
Perform a Phase 1 Environmental Site Assessment.

Martin Luther King Junior School performed a Phase 1 and Phase 2 Environmental Site assessment and also identified asbestos per the EPA 40 CFR standards and will complete the remediation per National Emission Standards for Hazardous Air Pollutants ("NESHAPS).

SSc1 – Site Selection
1 Point
Do not develop buildings, hardscape, roads or parking areas on portions of sites that meet any one of the criteria listed below.

Martin Luther King Junior School has not been developed on any of these restricted sites:

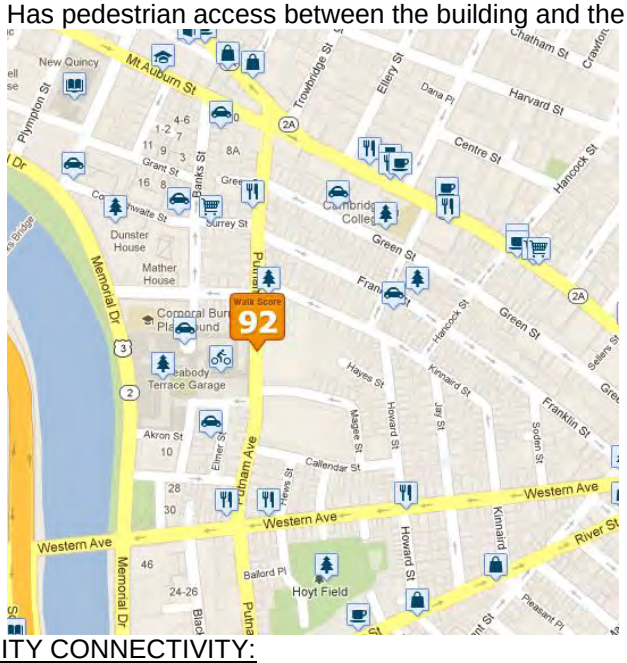
- ***Prime farmland as defined citation in 7CFR657.5.***
- ***Previously undeveloped land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by FEMA.***
- ***Land that is specifically identified as habitat for any species on Federal or State threatened or endangered lists***
- ***Within 100 feet of any wetlands as US Code of Fed. Regulations and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent.***
- ***Previously undeveloped land that is within 50 feet of a water body that supports or could support fish, recreation or industrial use, consistent with the terminology of the Clean Water Act.***
- ***Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner.***

SSc2 - Development Density and Community Connectivity
4 Points

OPTION 2: Community Connectivity

The project must meet the following criteria:

- Is located on a previously developed site
- Is within ½ mile of a residential area or neighborhood with an average density of 10 units per acre
- Is within ½ mile of at least 10 basic services (2 of the 10 services can be anticipated within a year; 1 of 10 can be located within the project itself)
- Has pedestrian access between the building and the services



FOR COMMUNITY CONNECTIVITY:

Martin Luther King Junior School meets the above criteria. It:

- ✓ ***is a previously developed site***
- ✓ ***is within ½ mile of a dense residential area in Cambridge***
- ✓ ***Is within ½ mile, with pedestrian access, of at least 10 basic services***

Coffee
near 100 Putnam Ave Cambridge M

Canteen	.22 mi
Dado Tea	.23 mi
Atomic Bean Cafe	.27 mi
Atomic Bean Cafe	.27 mi
Coast Cafe	.29 mi
Zinneken's	.30 mi
Zinneken's - Harvard Square	.30 mi
Zinneken's Belgian waffles...	.31 mi
Cafe Pamplona	.35 mi
Andala Coffee House	.42 mi

Restaurants & Bars
near 100 Putnam Ave Cambridge M

Petsi Pies	.14 mi
Basta Pasta	.16 mi
Western Front	.16 mi
Harvest of India	.21 mi
Garden at The Cellar	.21 mi
Pizza Ring	.21 mi
Domino's Pizza	.21 mi
Cellar Wine & Spirits	.22 mi
Greater Boston Buddhist C...	.22 mi
Greater Boston Buddhist C...	.23 mi

Outdoor Places
near 100 Putnam Ave Cambridge M

Putnam Park	294 ft
Burns Playground	500 ft
Franklin St Park	.16 mi
Sullivan Park	.17 mi
McNamee Square	.18 mi
Hoyt Field	.23 mi
Riverside Press Park	.32 mi
James Cronin Park	.37 mi
James Cronin Park	.40 mi
War Memorial Park	.48 mi

Groceries
near 100 Putnam Ave Cambridge M

Louie's Superette	.13 mi
Mass Market	.28 mi
Vermas Market	.28 mi
Whole Foods Market	.34 mi
Life Alive	.41 mi
Broadway Marketplace	.49 mi
Orinoco	.49 mi

SSc3 – Brownfield Redevelopment
1 Point
OPTION 1 Develop on a site documented as contaminated (by means of an ASTM E1903-97 Phase II Environmental Site Assessment or a local Voluntary Cleanup Program)
OPTION 3
Asbestos and other non-soil contamination in an existing structure may also qualify for brownfield redevelopment, per LEED Interpretation 5/9/2011 ID#10001. An asbestos plan should be developed by a qualified environmental professional and documented according to EPA and state regulations.

Martin Luther King Junior School performed a Phase II Environmental Site Assessment and found ground contamination in addition to asbestos within the building. The asbestos was identified per EPA Standards and will be remediated per National Emission Standards for Hazardous Air Pollutants ("NESHAPS").

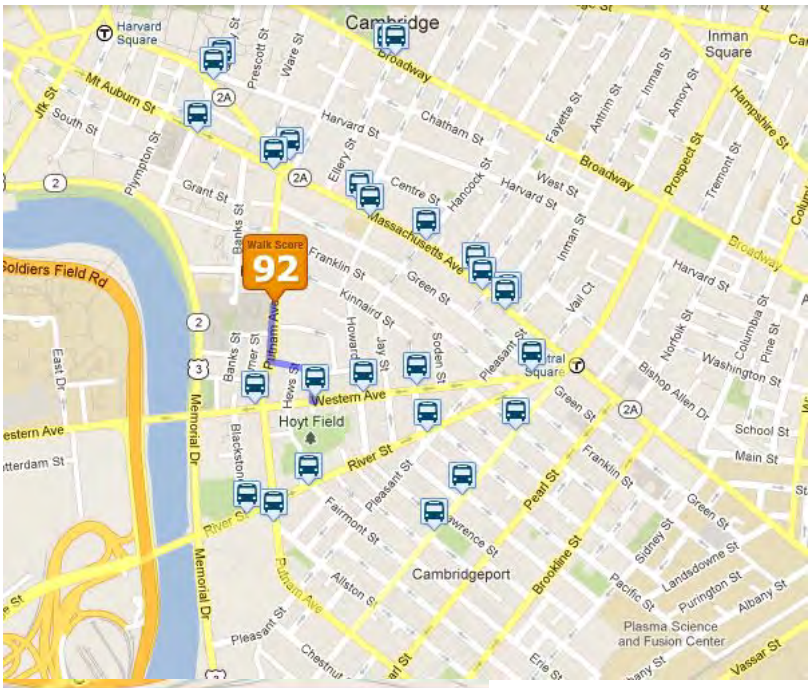
SSc4.1 - Alternative Transportation, Public Transportation Access
4 Points
OPTION 2. Bus Stop Proximity
Locate the project within 1/4-mile walking distance (measured from a main building entrance) of 1 or more stops for 2 or more public, campus, or private bus lines usable by building occupants.

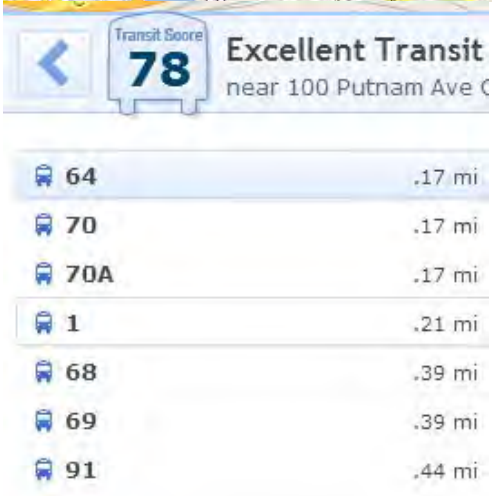
SCHOOLS Additional Requirement
A school bus system may count as 1 of these lines.

ALL OPTIONS

For all options (Options 1, 2, and 3 for Schools), provide dedicated walking or biking lanes to the transit lines that extend from the school building at least to the end of the school property in 2 or more directions without any barriers (e.g., fences) on school property.

The Project is meeting option 2 with more than two bus lines servicing the site. Additionally wider walkways than are currently available at Putnam, Kinnaird and Magee streets are proposed to facilitate pedestrian movement. Bicycle racks are provided at all entrances to the school. Further discussion about bicycle parking can be found in the Traffic Impact Study.





SSc4.2 - Alternative Transportation, Bicycle Storage & Changing Rooms
1 Point
SCHOOLS

Provide secure bicycle racks and/or storage within 200 yards of a building entrance for 5% or more of all building staff and students above grade 3 level (measured at peak periods). Provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of full-time equivalent (FTE) staff.

Provide dedicated bike lanes that extend at least to the end of the school property in 2 or more directions with no barriers (e.g., fences) on school property.

Shower and changing facilities are designed within the building, as are secure bicycle racks for a minimum of 5% of all building staff and students above grade level 3 in the building site. 75 Bicycle Parking Spaces have been provided per the current design. Dedicated bike lanes that extend at least to the end of the school property in 2 or more directions with no barriers will also be provided. All streets lead to school entrance points, and the playground to the east continues to link Kinnaird, Hayes and Magee Street with a pedestrian and bike friendly routes. Sidewalks at Kinnaird, Magee and Putnam are all modified to improve usability and safety.

SSc4.3 Alternative Transportation, Low Emitting & Fuel Efficient Vehicles
2 Points

SCHOOLS
Provide preferred parking (1) for low-emitting and fuel-efficient vehicles, (2) for 5% of the total vehicle parking capacity of the site and at least 1 designated carpool drop-off area for low-emitting and fuel-efficient vehicles.

The Martin Luther King Junior School parking plan will include the creation of dedicated parking spaces for LEFEVs, representing more than 5% of the total spaces on site. The school will also provide at least 1 designated carpool drop-off area for low-emitting and fuel-efficient vehicles.

SSc4.4 Alternative Transportation, Parking Capacity
2 Points
OPTION 3
Provide no new parking

OR
Size parking capacity to meet, but not exceed, minimum local zoning requirements.

Provide preferred parking1 for carpools or vanpools for 5% of the total parking spaces.

OPTION 3
74 Parking spaces will be developed for Martin Luther King Junior School. All but 6 of the relocated parking spaces will be located out of sight in an underground garage. We are determining if Option 1 or Option 3 would best fit the project. This credit is still in study.

SSc5.2 – Site Development, Maximize Open Space
1 Point
CASE 3 - Sites with Zoning Ordinances but No Open Space Requirements
Provide vegetated open space equal to 20% of the project's site area.

The intention of the site design is to maximize open space. Since we anticipate earing SS Credit 2 pedestrian-oriented hardscape areas can also contribute to credit compliance. For such projects, a minimum of 25% of the open space counted must be vegetated. We anticipate achieving this credit.

SSc6.1 – Stormwater Design, Quantity Control
1 Point
CASE 2. SITES WITH EXISTING IMPERVIOUSNESS GREATER THAN 50%

Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

Civil Narrative for SS6.1 & 6.2- Stormwater Best Management Practices and other measures to minimize runoff and improve water quality will be implemented: The site drainage will be designed to meet the provisions of the MassDEP Stormwater Management Policy for a redevelopment project. Stormwater management strategies for the proposed building and site improvements will seek to mitigate the stormwater runoff as required by the City of Cambridge standards and standard engineering practices of the State of Massachusetts. Proposed mitigation measures include the use of Cambridge-approved Best Management Practices ("BMP's"), including possible underground detention/infiltration systems, proprietary water quality management structures, and a rainwater collection/reuse cistern. Rainwater collected from the rooftops of the proposed building will be directed into the rainwater reuse cistern and any overflow will be routed to the drainage system in Kinnaird Street.

The proposed stormwater management system will generally consist of area drains and deep-sump, hooded catch basins, manholes, and underground pipes. A rainwater collection cistern and filtration system (located in the proposed parking garage) will capture and manage roof drainage for reuse within the building for toilet flushing. Water quality requirements will be met through site greening and proprietary water quality structures, as well as the rainwater collection/reuse system.

The proposed reuse cistern will collect stormwater runoff from the proposed roofs of the new building. The runoff from the roofs will be discharged directly to the rainwater cistern in the proposed parking garage. The rainwater collected in these cisterns will be reused for toilet flushing in the new building. Once the cistern fills to capacity, it will overflow to the underground conveyance pipes and out to City drainage systems in Kinnaird Street.

SSc6.2 – Stormwater Design, Quality Control
1 Point
Implement a stormwater management plan that reduces impervious cover, promotes infiltration and captures and treats the stormwater runoff from 90% of the average annual rainfall1 using acceptable best management practices (BMPs).

BMPs used to treat runoff must be capable of removing 80% of the average annual post development total suspended solids (TSS) load based on existing monitoring reports.

We are anticipating achieving this credit. The CE engineer will confirm when the design is complete. The project is including a rainwater harvesting system that will be used to collect and treat stormwater on site. We have to confirm the cistern size and quantity of stormwater treated in the coming weeks.

SS c7.1 Heat Island Effect, Non-Roof
1 Point
OPTION 2
Place a minimum of 50% of parking spaces under cover. Any roof used to shade or cover parking must have an SRI of at least 29, be a vegetated green roof or be covered by solar panels that produce energy used to offset some nonrenewable resource use.

More than 80% of the parking spaces will be below grade with an SRI complaint roof. Almost all surface parking has been eliminated (only 6 spaces remain) and the remaining spaces are now located in a reused portion of the existing school basement.

SS c7.2 Heat Island Effect, Roof
1 Point
OPTION 1
Use roofing materials with a solar reflectance index2 (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface.

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	> 2:12	29

100% of the roofing material will comply with these requirements.

SS c 8 Light Pollution Reduction
1 Point
Project teams must comply with one of the two options for interior lighting AND the requirement for exterior lighting.

For exterior lighting
Light areas only as required for safety and comfort. Exterior lighting power densities shall not exceed those specified in ANSI/ASHRAE/IESNA Standard 90.1-2007 with Addenda for the documented lighting zone. Justification shall be provided for the selected lighting zone. Lighting controls for all exterior lighting shall comply with section 9.4.1.3 of ANSI/ASHRAE/IESNA Standard 90.1- 2007, without amendments1.

LZ3: Medium (all other areas not included in LZ1, LZ2 or LZ4, such as commercial/ industrial, and high-density residential)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles (2.0 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal lux) 15 feet (4.5 meters) beyond the site. Document that no more than 5% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

SCHOOLS Additional Requirement
Sports Field Lighting (Physical Education Spaces)
Physical education spaces (playing fields) do not need to comply with the lighting power density requirements of this credit, as per ANSI/ASHRAE/IESNA Standard 90.1-2007 section 9.4.5, exception E. Automatic Shutoff: All sports lighting must be automatically controlled to shut off no later than 11 p.m.. Manual override must be provided to avoid disruption of school sponsored sporting events.

All light fixtures will employ full cut-off optical systems to direct light downwards to eliminate light trespass issues with adjacent residences.

Building exterior lighting will provide for safe and pleasant arrival and entry into the School. There will be no conventional building façade lighting or decorative lighting elements. Site walkways will be illuminated with pole mounted fixture using LED sources with excellent color characteristics and light pollution control. By code, all means of egress will be lighted and with full cut-off fixtures to reduce glare and eliminate light trespass. Select landscape elements will be lighted carefully from low-intensity fixtures for visual interest and orientation. A lighting control system will manage light levels after normal operational hours and in some cases will automatically dim fixtures when areas are unoccupied, using sensing technologies to bring them back to full intensity when necessary.

SSc 10 Joint Use of Facilities

1 Point

In collaboration with the school board or other decision-making body, ensure that at least 3 of the following spaces included in the school are accessible to and available for shared use by the general public: auditorium, gymnasium, cafeteria/cafetorium, 1 or more classrooms, playing fields, and/or joint parking. Provide a separate entry to the spaces intended for joint use. The entry can be from a school lobby or corridor near an entrance convenient to public access, which can be secured from the rest of the school after normal school hours and has toilets available.

OPTION 2

In collaboration with the school board or other decision-making body, engage in a contract with community or other organizations to provide at least 2 dedicated-use spaces in the building.

Dedicated-use spaces include, but are not limited to:

- Commercial office
- Health clinic
- Community service centers (provided by state, city, or county offices)
- Police offices
- Library or media center
- Parking lot
- One or more commercial sector businesses

Provide a separate entry to the spaces intended for joint use. The entry can be from a school lobby or corridor near an entrance convenient to public access, which can be secured from the rest of the school after normal school hours and which has toilets available.

In collaboration with the school board or other decision-making body, ensure that at least 3 of the following types of spaces included in the school are accessible to and available for shared use by the general public: auditorium, gymnasium, cafeteria/cafetorium, 1 or more classrooms, playing fields, and/or joint parking.

Provide a separate entry to the spaces intended for joint use. The entry can be from a school lobby or corridor near an entrance convenient to public access, which can be secured from the rest of the school after normal school hours and has toilets available.

OR

OPTION 3

In collaboration with the school district or other decision-making body, ensure that at least 2 of the following 6 spaces that are owned by other organizations/agencies are accessible to students:

- Auditorium
- Gymnasium
- Cafeteria
- One or more classrooms
- Swimming pool
- Playing field

Provide direct pedestrian access to these spaces from the school. In addition, provide signed agreements with the other organizations/ agencies that stipulate how they and the school district and organizations or agencies will share these spaces.

Joint Use of Facilities
The project will be meeting option 1 & 2- We will reserve this credit for exemplary performance

B. Water Efficiency

WEp1 – Water Use Reduction-20% Reduction
Required
Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements. Calculations are based on estimated occupant usage and must include only the following fixtures (as applicable to the building): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

The project will be exceeding this prerequisite of a 20% reduction in water use reduction through rainwater reuse and low flow plumbing fixtures. The building and site design will be designed to make use of water-conserving plumbing where possible and to minimize the amount of stormwater runoff through the use of best management practices for stormwater management: The following strategies and technologies will be employed in the plumbing design, which aid in water conservation:

- ***Low-flow plumbing fixtures in restrooms***
- ***Rainwater Collection and Reuse Cistern to reduce toilet demands***
- ***Reduced or eliminated irrigation by use of native, tolerant plant species***

WEc1.1 - Water Efficient Landscaping, Reduce by 50%
2 Points
OPTION 1: REDUCE BY 50% (2 POINTS)
Reduce potable water consumption for irrigation by 50% from a calculated midsummer baseline case or using the month with the highest irrigation demand.

Easily achievable with proposed highly efficient irrigation.

WEc, 1.2 - Water Efficient Landscaping No Potable Use or No Irrigation
2 Points
OPTION 2: NO POTABLE WATER USE OR IRRIGATION1 (4 POINTS)
PATH 1
Use only captured rainwater, recycled wastewater, recycled graywater or water treated and conveyed by a public agency specifically for nonpotable uses for irrigation.

PATH 2
Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within a period not to exceed 18 months of installation.

The Martin Luther King Junior School will evaluate potential of eliminating irrigation. Final plant selection and design will need to be completed before this can be confirmed.

WEc2- Innovative Wastewater
2 Points
OPTION 1
Reduce potable water use for building sewage conveyance by 50% through the use of water-conserving fixtures (e.g., water closets, urinals) or nonpotable water (e.g., captured rainwater, recycled graywater, on-site or municipally treated wastewater).

The project is including a rainwater harvesting system that will be storing and treating stormwater for flushing water closets within the building. We are anticipating exceeding this 50% reduction with the re-use system and the low flow water closets we have specified for the project.

WEc3- Water Use Reduction, 30-40% Reduction
2-4 Points
Employ strategies that in aggregate use less water than the water use baseline calculated for the building (not including irrigation). The minimum water savings percentage for each point threshold is as follows:

% Reduction	Points
30%	2
35%	3
40%	4

With the combination of high efficient plumbing fixtures and the rainwater harvesting for flushing we anticipate a minimum of a 30% water use reduction.

Fixtures and flow rates:
Water closets – 1.1-1.3 GPF
Low flow urinals-.125 GPF
Lavatory faucets- .25 GPM
Showers-1.5 GPM
Kitchen sink faucets 1GPM
Pre-rinse spray valves- TBD

WEc4 Process Water Use Reduction
1 Point
SCHOOLS
To receive this credit, buildings must have the following:
No refrigeration equipment using once-through cooling with potable water
No garbage disposals n At least 4 process items where water use is at or below the levels shown in the table below. Inclusion of any equipment not listed in the table below must be supported by documentation showing a 20% reduction in water use from a benchmark or industry standard.

The team is evaluating the ability to meet this credit. We will have the calculations complete in the coming weeks.

C. Energy & Atmosphere

EAp1 - Fundamental Building Systems Commissioning (construction credit)
Required
The following commissioning process activities must be completed by the project team:
1) Designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the completion of the commissioning process activities.
a) The CxA must have documented commissioning authority experience in at least two building projects.
b) The individual serving as the CxA must be independent of the project's design and construction management, though they may be employees of the firms providing those services. The CxA may be a qualified employee or consultant of the Owner.
c) The CxA must report results, findings and recommendations directly to the Owner.
d) For projects smaller than 50,000 gross square feet, the CxA may include qualified persons on the design or construction teams who have the required experience.
2) The Owner must document the Owner's Project Requirements (OPR). The design team must develop the Basis of Design (BOD). The CxA must review these documents for clarity and completeness. The Owner and design team must be responsible for updates to their respective documents.
3) Develop and incorporate commissioning requirements into the construction documents.
4) Develop and implement a commissioning plan.
5) Verify the installation and performance of the systems to be commissioned.
6) Complete a summary commissioning report.

Commissioning process activities will be completed for the following energy-related systems, at a minimum. The commissioning agent is contracted directly to the city:
❑ Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls.
❑ Lighting and daylighting controls.
❑ Domestic hot water systems.
❑ Renewable energy systems (wind, solar, etc.).

EAp2 - Minimum Energy Performance
Required
ENERGY AND ATMOSPHERE
EAp2 Minimum Energy Performance & EAc1 Optimized Energy Performance:
"Comply with the mandatory requirements of ASHRAE 90.1-2007 for all major components, including the envelope, HVAC, lighting and domestic hot water.
- Demonstrate a 10 percent savings (5 percent for existing buildings) compared with a baseline case meeting the minimum requirements of ASHRAE 90.1"

The team is targeting a Net Zero Energy Goal. We are anticipating earning all of the Optimize Energy Performance credits with a very aggressive energy reduction strategy partnered with on-site solar generation. Current Schematic Modeling results demonstrate a 58.8% to 61.4% energy reduction for this project. Please see EA Credit 1 for a summary of results and Appendix B for the summary report.

EAp3 - Fundamental Refrigerant Management
Required

Zero use of CFC-based refrigerants in new base building HVAC&R and fire suppression systems.

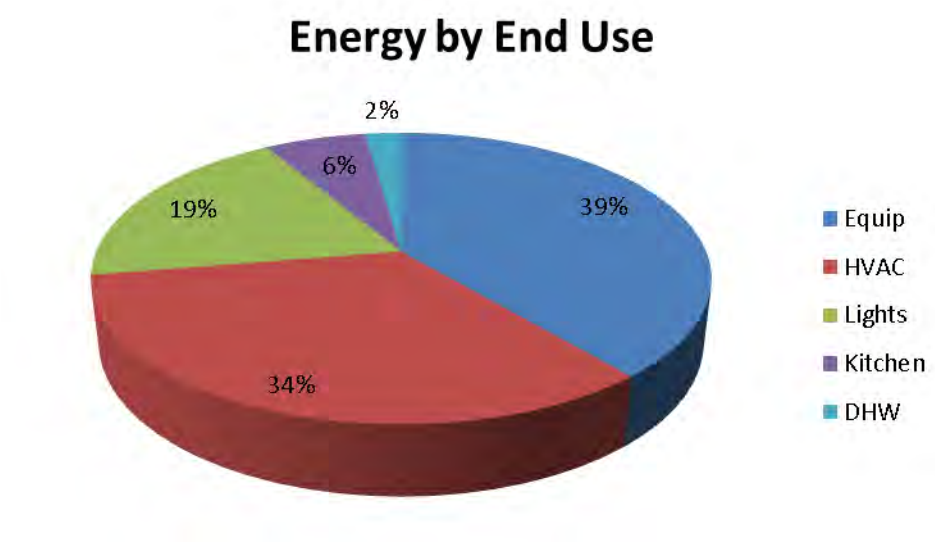
This project will be designed without the use of CFC or HCFC refrigerants.

EAc1 - Optimize Energy Performance
1-19 Points
SCHOOLS
The project must establish an energy performance rating goal for the facility design using EPA's Target Finder rating tool.
OPTION 1. Whole Building Energy Simulation
NC, SCHOOLS & CS

- Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.
- Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda1) using a computer simulation model for the whole building project. Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method includes all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:
- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007

The team is targeting a Net Zero Energy Building. We are anticipating earning all 19 of the Optimize Energy Performance credits with a very aggressive energy reduction strategy partnered with on-site solar generation. The design is in progress and this energy model massing is most current available and will continue to be updated throughout design. The square footage and elevation studies have since been modified and will be updated in the next iteration.

Energy Model Results: A schematic level energy model has been developed based on the basic geometry developed at the beginning of the schematic design phase with updated information regarding lighting, daylighting and HVAC systems. The model also incorporates the detailed information about occupancy, schedules and user equipment gained through the net zero energy workshops. The model is currently predicting annual energy use for the school as follows:



Energy Use Type	***Energy (Mil BTU / year)***
Equipment	***1,944***
HVAC	***1,684***
Lights	***953***
Kitchen	***316***
Domestic Hot Water	***113***
Total	***5,010***

Energy Model Process: The energy model being used to estimate annual energy use for the new MLK, Jr & Putnam Avenue Schools has been created using the software program eQUEST, version 3-64. This program utilizes the DOE-2.2 simulation engine developed by the US Department of Energy and the California Public Utilities Corporation. The program calculates building energy use on an hourly basis for 8,760 hours per year (full year) and utilizes typical meteorological year (TMY) weather data. TMY weather data is average weather data based on approximately 30 years of weather data for a given location. The inputs for the program have been generated based on the building geometry, materials and systems under design for the project as well as information about occupancy, building schedules and use gathered as part of building tours, interviews and focus group meetings. All of the above information is used to create a virtual model of the building that is then analyzed for energy use based on the weather conditions in a typical year.

Every effort has been made to gather and include as much detailed information as possible about the building, building occupancy patterns and schedules, system operating schedules, equipment and equipment use in order to develop as realistic an estimate of annual energy use as possible. This detailed information was gathered through the net zero energy schematic design process described previously.

Comparison to ASHRAE 90.1-2007 Baseline: A preliminary comparison to an ASHRAE 90.1 baseline has been completed for the MLK School. The baseline building was developed following the energy modeling protocols established in Appendix G of ASHRAE Standard 90.1 - 2007. This is the same methodology used to determine energy performance for new buildings and major renovation projects in the LEED Green Building

Rating System. The following is the preliminary ASHRAE 90.1 baseline building energy use intensity (site) as well as a comparison to the predicted energy use intensity of the design without contingency:

- ***Preliminary baseline building energy use intensity (site): 75 to 80 kbtu/sf/year***
- ***Percent energy use reduction of design vs. baseline building: 58.8% to 61.4% reduction***

Credit 2 On-Site Renewable Energy (1%, 5%, 9%, 13%)

1-7 Points

NC, SCHOOLS & CS

Use on-site renewable energy systems to offset building energy costs. Calculate project performance by expressing the energy produced by the renewable systems as a percentage of the building's annual energy cost and use the table below to determine the number of points achieved.

Use the building annual energy cost calculated in EA Credit 1: Optimize Energy Performance or the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey database to determine the estimated electricity use.

The minimum renewable energy percentage for each point threshold is as follows:

NC & SCHOOLS
Percentage Renewable Energy Points
1% 1
3% 2
5% 3
7% 4
9% 5
11% 6
13% 7

The team is targeting a Net Zero Energy Building. We are proposing a Photovoltaic installation on-site that will, at a minimum, generate 13% of the total energy use of the building.

EAc3 Enhanced Commissioning (Construction Credit)

2 Points

Requirements

NC, SCHOOLS & CS

Implement, or have a contract in place to implement, the following additional commissioning process activities in addition to the requirements of EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems and in accordance with the LEED Reference Guide for Green Building Design and Construction, 2009 Edition:

- Prior to the start of the construction documents phase, designate an independent commissioning authority (CxA) to lead, review, and oversee the completion of all commissioning process activities.
- The CxA must report results, findings and recommendations directly to the owner.
- The CxA must conduct, at a minimum, 1 commissioning design review of the owner's project requirements basis of design, and design documents prior to the mid-construction documents phase and back-check the review comments in the subsequent design submission.
- The CxA must review contractor submittals applicable to systems being commissioned

for compliance with the owner's project requirements and basis of design. This review must be concurrent with the review of the architect or engineer of record and submitted to the design team and the owner.

- The CxA or other project team members must develop a systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems.
- The CxA or other project team members must verify that the requirements for training operating personnel and building occupants have been completed.
- The CxA must be involved in reviewing the operation of the building with operations and maintenance (O&M) staff and occupants within 10 months after substantial completion.

A plan for resolving outstanding commissioning-related issues must be included.

Enhanced Commissioning will be completed for the project.

EAc4 Enhanced Refrigerant Management
1 Point
OPTION 2
Select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming. The base building HVAC&R equipment must comply with the formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential.

The team will confirm that the project is designed to meet the Enhanced Refrigerant standard.

EAc5- ***Measurement and Verification***

2 points
OPTION 1
Develop and implement a measurement and verification (M&V) plan consistent with Option D: Calibrated Simulation (Savings Estimation Method 2) as specified in the International Performance Measurement & Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction, April, 2003.
The M&V period must cover at least 1 year of post-construction occupancy.
Provide a process for corrective action if the results of the M&V plan indicate that energy savings are not being achieved.

The project will be completing a calibrated simulation of the energy model.

EAc6 – Green Power (Construction Credit)
2 points
Provide at least 35% (70% for EP) of the building's electricity from renewable sources by engaging in a renewable energy contract for a period of at least 2 years. Renewable sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements.

OPTION 1 - Determine the Baseline Electricity Use
Use the annual electricity consumption from the results of EA Credit 1.

The project plans to comply with the above requirements for Green Power. A renewable energy contract will be included in the construction submission.

D. Materials & Resources

MRp1 -- Storage & Collection of Recyclables
Required
Provide an easily accessible area that serves the entire building and is dedicated to the collection and storage of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

The project will have a dedicated recycling area as a part of the trash collection for the building. The school at a minimum is collecting paper, corrugated cardboard, glass, plastics and metals.

MRc2 Construction Waste Management (construction credit)
1-2 Points
Recycle and/or salvage at least 50% of non-hazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or co-mingled. Excavated soil and land-clearing debris do not contribute to this credit. Calculations can be done by weight or volume, but must be consistent throughout. The minimum percent diversion is as follows: 50% - 1 pt; 75% - 2 pts; 95% - 1 EP point.

The project will develop and implement a construction waste management plan that will identify demolition and construction waste materials to be diverted from landfill. The materials will be sorted on-site or co-mingled. The project is targeting 75% diversion from landfill.

MRc4 Recycled Content (construction credit)
1-2 Points
Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point is as follows: 10% - 1 pt; 20% - 2 pts; 30% for EP point. The recycled content value of a material assembly must be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. Mechanical, electrical and plumbing components and specialty items such as elevators must not be included in this calculation. Only include materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credits 3–7.

The project will use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% and possibly 20%, based on cost, of the total value of the materials in the project.

MRc5 Regional Materials (Construction Credit)
1-2 Points
Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) must contribute to the regional value. The minimum percentage of regional materials for each point is as follows: 10% - 1 pt; 20% - 2 pts; 30% - EP point. Mechanical, electrical and plumbing components and specialty items such as elevators and equipment must not be included in this

calculation. Only include materials permanently installed in the project. Furniture may be included, providing it is included consistently in MR Credits 3–7.

Martin Luther King Junior School Street plans to use building materials or products that have been extracted, harvested or recovered, and manufactured, within 500 miles of the project site, for 10%-20% of the total materials value.

MRc6 Rapidly Renewable Materials (Construction Credit)
1 Point
Use rapidly renewable materials for 2.5% (based on cost) of all building materials and products used in the project.

Martin Luther King Junior School Street is investigating the use of rapidly renewable materials for 2.5% of the total materials cost for the project. Documentation demonstrating compliance will be included in the construction submission.

MRc7 Certified Wood (Construction Credit)
1 Point

Use a minimum of 50% of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria, for wood building components. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Only include materials permanently installed in the project. Furniture may be included, providing it is include consistently in MR Credits 3–7.

Martin Luther King Junior School is investigating the use of certified wood for at least 50% of the total cost of wood for the project. Documentation demonstrating compliance will be included in the construction submission.

E. Indoor Environmental Quality

EQp1 Minimum IAQ Performance
Required
Meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2007. Mechanical ventilation systems must be designed using the Ventilation Rate Procedure or the applicable local code, whichever is more stringent. Naturally ventilated buildings must comply with ASHRAE 62.1-2007, paragraph 5.1.

MEP Statement:
The project will be designed to meet the minimum requirements of ASHRAE 62-2007 Table 6-1 the "Minimum Ventilation Rates in Breathing Zone".

EQp2 Environmental Tobacco Smoke (ETS) Control
Required
OPTION 1
❑ Prohibit smoking in the building.
❑ Locate any exterior designated smoking areas at least 25 feet away from entries, outdoor air intakes and operable windows. Provide signage to allow smoking in designated areas.

The project will comply with Option 1- Smoking is not allowed on the Martin Luther King Junior School School property, inside or outside the building, at any time. This policy will be outlined in the staff and student handbook.

Prereq 3 Minimum Acoustical Performance
Required
Minimum Acoustical Performance IEQ PREREQUISITE 3
Prerequisite NA IEQ Prerequisite 3 NA

Background Noise
Achieve a maximum background noise level1 from heating, ventilating and air conditioning (HVAC) systems in classrooms and other core learning spaces of 45 dBA.
AND
Reverberation Time
Design classrooms and other core learning spaces to include sound-absorptive finishes to sufficiently limit reverberation in classrooms and other core learning spaces.

CASE 1. Classrooms and Core Learning Spaces < 20,000 Cubic Feet
For classrooms and core learning spaces less than 20,000 cubic feet, options for compliance include:

OPTION 1. Minimum NRC
For each room, confirm that the total surface area finished with a material with a Noise Reduction Coefficient (NRC) of 0.70 or higher equals or exceeds the total ceiling area (excluding lights, diffusers and grilles).

OR

OPTION 2. Compliance with ANSI Standard S12.60-2002
Confirm through calculations described in ANSI Standard S12.60-2002 that rooms are designed to meet reverberation time requirements as specified in that standard.

CASE 2. Classrooms and Core Learning Spaces ≥ 20,000 Cubic Feet
For classrooms and core learning spaces 20,000 cubic feet or greater, confirm through calculations described in ANSI Standard S12.60-2002 that rooms are designed to have a reverberation time of 1.5 seconds or less.

Martin Luther King Junior School Street will meet the required Minimum Acoustical Performance prerequisite in addition to the Enhanced Acoustical Performance Credit.

EQc1 Outdoor Air Delivery Monitoring
1 point
Install permanent monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain design minimum ventilation requirements. Configure all monitoring equipment to generate an alarm when the conditions vary by 10% or more from setpoint, via either a building automation system alarm to the building operator or via a visual or audible alert to the building occupants.

AND

FOR MECHANICALLY VENTILATED SPACES:
❑Monitor carbon dioxide concentrations within all densely occupied spaces (those with a design occupant density greater than or equal to 25 people per 1000 sq ft.). CO2 monitoring locations must be between 3 feet and 6 feet above the floor.

❑ For each mechanical ventilation system serving non-densely occupied spaces, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor airflow rate with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2007.

Martin Luther King Junior School Street will install a permanent system for CO2 monitoring and outdoor air measurement, as required for Mechanically Ventilated Spaces.

EQc3.1 Construction IAQ Management Plan, During Construction **(construction credit)**
1 Point
Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:
❑ During construction meet or exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition 2007, ANSI/SMACNA 008-2008 (chapter 3).
❑ Protect stored on-site or installed absorptive materials from moisture damage.
❑ If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grille, as determined by ASHRAE 52.2-1999. Replace all filtration media immediately prior to occupancy.

The project will follow all of the above requirements for implementation and documentation of SMACNA, along with installation and replacement of filtration media prior to occupancy.

EQc3.2 Construction IAQ Management Plan, Pre-Occupancy **(construction credit)**
1 Point
OPTION 1: Flushout: Develop an IAQ management plan and implement it after all finishes have been installed and the building has been completely cleaned before occupancy.

The project intends to perform a flush-out prior to occupancy.

EQc4.1 Low-Emitting Materials, Adhesives & Sealants **(construction credit)**
1 Point
Adhesives and sealants used on the interior of the building (i.e. inside of the weatherproofing system and applied on-site) must comply with the following criteria:
❑ Adhesives, sealants and sealant primers must comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits must be conforming to those listed in Reference Guide table.
❑ Aerosol Adhesives must comply with standards of Green Seal Standard for Commercial Adhesives, listed in Reference Guide table.

The Martin Luther King Junior School project intends to comply with the above requirements for adhesives and sealants.

EQc4.2 Low-Emitting Materials, Paints (construction credit)
1 Point
Paints and coatings used on the interior of the building (i.e. inside of the weatherproofing system and applied on-site) must comply with the following criteria:
❑ Architectural paints and coatings applied to interior walls and ceilings must not exceed the VOC content limits established in Green Seal Standard GS-11 Paints, 1st edition.

❑ Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd edition.
❑ Clear wood finishes, floor coatings, stains, primers, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 113, Architectural Coatings.

The project intends to comply with the above requirements for paints.

EQc4.3 Low-Emitting Materials, Flooring Systems (Construction Credit)
1 Point
To comply with this credit, all interior carpet must meet the requirements of the Carpet and Rug Institute's Green Label Plus program, and all carpet cushions must meet the requirements of the Capet and Rug Institute Green Label program. Additionally, all carpet adhesive must meet the VOC limit of 50 g/L.

Martin Luther King Junior School Street plans to comply with the above requirements for flooring systems.

EQc4.4 Low-Emitting Materials, Composite Wood & Agrifiber Products (Construction Credit)
1 Point
Composite products and laminating adhesives shall have no added urea-formaldehyde resins.

The project plans to use no composite wood and Agrifiber products with added UF resins. Cut sheets demonstrating compliance will be included in the construction submission.

EQc5 Indoor Chemical & Pollutant Source Control
1 Point
Design to minimize and control the entry of pollutants into buildings and later cross-contamination of regularly occupied area through the following strategies:
❑ Employ permanent entryway systems at last ten feet long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entrances.
❑ Sufficiently exhaust each space where hazardous gases or chemicals may be present or used (e.g. garages, housekeeping and laundry areas, science laboratories, prep rooms, art shops, shops of any kind, and copying and printing rooms) to create negative pressure with respect to adjacent spaces when the doors to the room are closed.
❑ In mechanically ventilated buildings, install new air filtration media in regularly occupied areas prior to occupancy; these filters must provide a minimum efficiency reporting value (MERV) of 13 or higher. Filtration should be applied to process both return and outside air that is delivered as supply air.
❑ Provide containment (i.e. a closed container for storage for off-site disposal in a regulatory compliant storage area, preferably outside the building) for appropriate disposal of hazardous liquid wastes in places where water and chemical concentrate mixing occurs (e.g. housekeeping, janitorial and science laboratories).

Martin Luther King Junior School is investigating full compliance with all requirements for indoor chemical & pollutant source control.

EQc6.1 Controllability of Systems, Lighting
1 Point

Provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences.
AND
Provide lighting system controls for all learning spaces, including classrooms, laboratories, art rooms, gymnasiums, etc., to enable adjustments to suit group needs and preferences.

Martin Luther King Junior School Street is designed to comply with the standard by providing individual lighting controls for at least 90% of the occupants and will provide lighting system controls for all learning spaces.

EQc6.2 Controllability of Systems, Thermal Comfort
1 Point
Provide individual comfort controls for 50% (minimum) of the building occupants to enable adjustments (for workspaces in school projects) to meet individual needs and preferences. Operable windows may be used in lieu of controls for occupants located 20 feet inside and 10 feet to either side of the operable part of a window.
AND
Provide comfort control systems for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences. Conditions for thermal comfort are described in ASHRAE Standard 55-2004.

Martin Luther King Junior School Street will comply with the requirements of this credit by allowing at least 50% of occupants' individual access to control either, the air speed, air temperature, radiant temperature, or humidity provided by mechanical systems, in individually occupied spaces. In all multi-occupant spaces, at least one means to control thermal comfort will be provided.

EQc7.1 Thermal Comfort, Design
1 point
Design HVAC systems and the building envelope to meet requirements of ASHRAE Standard 55-2004. Demonstrate design compliance in accordance with the Section 6.1.1 documentation.

The project will be designed in conformance with the Massachusetts State Building Code, IECC 2009 and ASHRAE Standard 55 climate zone 5. The mechanical systems selected for the building will be designed to maintain the required thermal comfort standards as recommended by ASHRAE Standard 55.

EQ c7.2 Thermal Comfort Verification
1 point

Achieve IEQ Credit 7.1: Thermal Comfort—Design
AND

Agree to conduct a thermal comfort survey of building occupants (adults and students of grades 6 and above) within 6 to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the building, including an assessment of overall satisfaction with thermal performance and identification of thermal comfort problems. Agree to develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the building. This plan should include measurement of relevant environmental variables in problem areas in accordance with ASHRAE Standard 55-2004 (with errata but without addenda).

Martin Luther King Junior School will survey the adults and students of grades 6 and above 6-18 months following completion of the improvements to find out if they are satisfied with thermal conditions in the building. A corrective action plan will be designed and implemented if greater than 20% of occupants report dissatisfaction with a certain element of thermal comfort.

EQc8.1 Daylight & Views
1-3 points

SCHOOLS
Classroom Spaces Points
75% 1 point
90% 2 points

OPTION 1. Simulation
Demonstrate through computer simulations that 75% (NC, Schools & CS) or 90% (Schools Only) or more of all regularly occupied spaces achieve daylight illuminance levels of a minimum of 25 footcandles (fc) and a maximum of 500 fc in a clear sky condition on September 21 at 9 a.m. and 3 p.m.; areas with illuminance levels below or above the range do not comply. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 25 fc illuminance level.

- 75% of all other regularly occupied spaces (1 additional point). Project teams can achieve a point for these other spaces only if they have also achieved at least 1 point for classroom spaces.

Martin Luther King Junior School Street is designed such that 90% of classroom spaces are compliant and a simulation will be completed to demonstrate compliance.

EQc8.2 Daylight & Views, Views for 90% of Spaces (Construction Credit)
1 Point
Achieve direct line of sight to the outdoor environment via vision glazing between 30 and 90 inches above finish floor for building occupants in 90% of all regularly occupied areas. Determine the area with direct line of sight by totaling the regularly occupied square footage that meets the following criteria:

❑ In plan view, the area is within sight lines drawn from perimeter vision glazing.
❑ In section view, a direct sight line can be drawn from the area to perimeter vision glazing.

Line of sight may be drawn through interior glazing. For private offices, the entire square footage of the office can be counted if 75% or more of the area has direct line of sight to perimeter vision glazing. For multi-occupant spaces, the actual square footage with direct line of sight to perimeter vision glazing is counted.
1 EP point is available for meeting at least 2 of the following requirements:

- 90% or more of regularly occupied spaces have multiple lines of sight to vision glazing in different directions at least 90 degrees apart.
- 90% or more of regularly occupied spaces have views that include views of at least 2 of the following 3 options: vegetation, human activity, or objects at least 70 feet from the exterior of the glazing.
- 90% or more of regularly occupied spaces have access to unobstructed views located within the distance of 3 times the head height of the vision glazing.
- 90% or more of regularly occupied spaces have access to views with a view factor of 3 or greater.

Martin Luther King Junior School Street plans to be compliant for 90% of spaces.

EQc9 Enhanced Acoustical Performance
1 Point
SCHOOLS
Sound Transmission
Design the building shell, classroom partitions and other core learning space partitions to meet the Sound Transmission Class (STC) requirements of ANSI Standard S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools, except windows, which must meet an STC rating of at least 35.

AND

Background Noise
Reduce background noise level1 to 40 dBA or less from heating, ventilating and air conditioning (HVAC) systems in classrooms and other core learning spaces.

Martin Luther King Junior School Street plans to meet the requirements of the Enhanced Acoustical Performance Credit.

Credit 10 Mold Prevention
1 Point
SCHOOLS
Project teams must achieve the following credits:

- IEQ Credit 3.1: Construction Indoor Air Quality Management Plan—During Construction
- IEQ Credit 7.1: Thermal Comfort—Compliance
- IEQ Credit 7.2: Thermal Comfort—Verification

Provide heating, ventilating and air conditioning (HVAC) systems and controls designed to limit space relative humidity to 60% or less during all load conditions, both occupied and unoccupied.

Develop and implement on an ongoing basis an IAQ management program for buildings based on the U.S. Environmental Protection Agency (EPA) document, Building Air Quality: A Guide for Building Owners and Facility Managers, EPA reference number 402-F-91-102, December 1991.

Martin Luther King Junior School plans to achieve; IEQ Credit 3.1: Construction Indoor Air Quality Management Plan—During Construction, IEQ Credit 7.1: Thermal Comfort—Compliance, and IEQ Credit 7.2: Thermal Comfort—Verification.

F. Innovation & Design (I.D.) Process

4 Points

IDc1.1 Innovation & Design Education Plan –
1 Point
Martin Luther King Junior School School will install signage throughout the building and property that identifies and briefly explains the environmental qualities of certain sustainable design features.

IDc1.2 Innovation & Design- Exemplary Performance- Joint Use of Facilities

1 Point
The project intends to achieve the Exemplary Performance Credit for Joint Use of Facilities.

IDc1.3 Innovation & Design- Exemplary Performance-Optimize Energy Performance
1 Point
The project intends to achieve the Exemplary Performance Credit for Optimize Energy Performance.

IDc1.4 Innovation & Design- Exemplary Performance- On-Site Renewable Energy
1 Point
The project intends to achieve the Exemplary Performance Credit for On-Site Renewable Energy.

IDc2 LEED Accredited Professional
1 Point
Colleen Soden is the LEED AP for the project.

IDc2 The School as A Teaching Tool
The project intends to pursue this credit in the construction submission.

G. Regional Credits

1-4 Points
3 Points YES, 1 Point Maybe

The project achieves the following regional credits:

EAc2
SSc3
SSc7.1
SSc7.2

IV. APPENDICES

Appendix A: IDc2 LEED Registration & Accredited Professional-

LEED AFFIDAVIT:

Project Site: 100 Putnam Ave, Cambridge MA

In accordance with Section 22 of the City of Cambridge Zoning Ordinance, I, Colleen Soden, LEED LEED AP BD&C hereby certify that to the best of my knowledge the MLK Junior School, 100 Putnam Ave, Cambridge, MA has been designed to meet the green building requirements at Article 22.20 of the Cambridge Zoning Ordinance and to achieve a LEED rating of (minimum) Silver with 75 points as indicated on the attached LEED for Schools 2009 Checklist dated 2/28/2012. The certification is based on LEED for Schools.

Colleen Ryan Soden

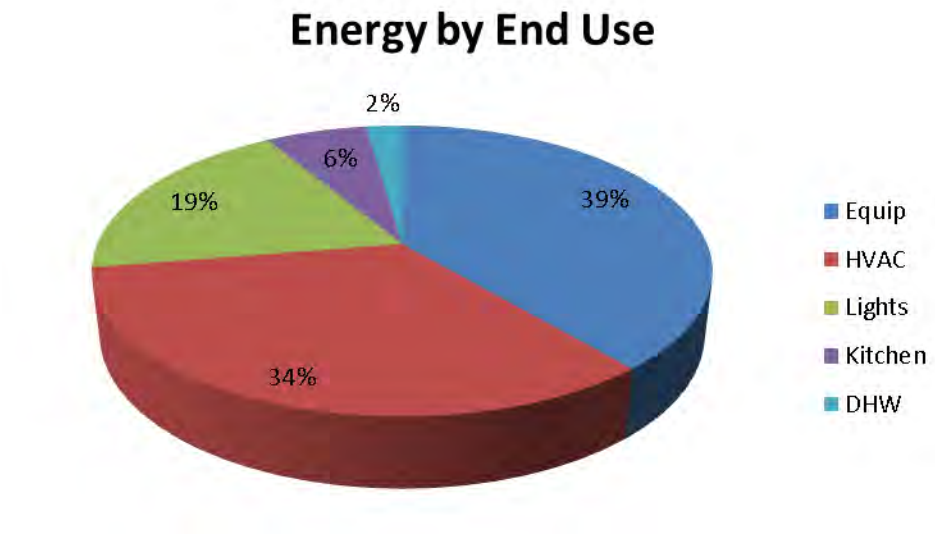
Colleen Ryan Soden is the LEED Administrator and Sustainability Consultant
Project ID 1000027798
MLK Junior School
Cambridge MA 02139 US | Registered 10/10/2012

Appendix B: EA Credit 1- Optimize Energy Performance- SD Energy Model Results

The design is in progress and this energy model massing is most current available and will continue to be updated throughout design. The square footage and elevation studies have since been modified and will be updated in the next iteration.

Annual Energy Requirements (Energy Model):

Energy Model Results: A schematic level energy model has been developed based on the basic geometry developed at the beginning of the schematic design phase with updated information regarding lighting, daylighting and HVAC systems. The model also incorporates the detailed information about occupancy, schedules and user equipment gained through the net zero energy workshops. The model is currently predicting annual energy use for the school as follows:



Energy Use Type	Energy (Mil BTU / year)
Equipment	1,944
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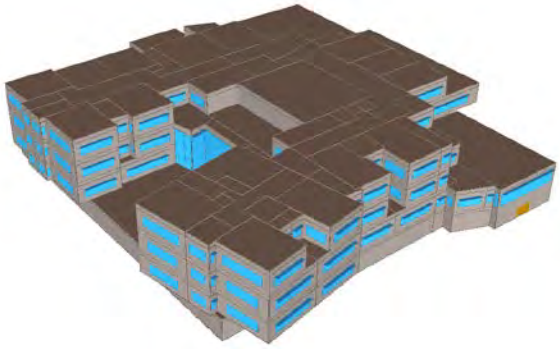
Lights	953
Kitchen	316
Domestic Hot Water	113
Total	5,010

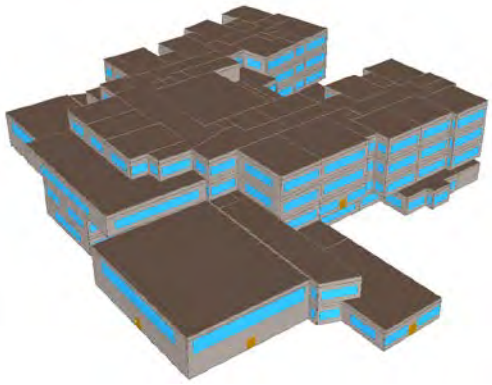
Energy Model Process: The energy model being used to estimate annual energy use for the new MLK, Junior & Putnam Avenue Schools has been created using the software program eQUEST, version 3-64. This program utilizes the DOE-2.2 simulation engine developed by the US Department of Energy and the California Public Utilities Corporation. The program calculates building energy use on an hourly basis for 8,760 hours per year (full year) and utilizes typical meteorological year (TMY) weather data. TMY weather data is average weather data based on approximately 30 years of weather data for a given location.

The inputs for the program have been generated based on the building geometry, materials and systems under design for the project as well as information about occupancy, building schedules and use gathered as part of building tours, interviews and focus group meetings. All of the above information is used to create a virtual model of the building that is then analyzed for energy use based on the weather conditions in a typical year.

Every effort has been made to gather and include as much detailed information as possible about the building, building occupancy patterns and schedules, system operating schedules, equipment and equipment use in order to develop as realistic an estimate of annual energy use as possible. This detailed information was gathered through the net zero energy schematic design process described previously.



Southwest View



Northeast View

Comparison to ASHRAE 90.1-2007 Baseline: A preliminary comparison to an ASHRAE 90.1 baseline has been completed for the MLK School. The baseline building was developed following the energy modeling protocols established in Appendix G of ASHRAE Standard 90.1 - 2007. This is the same methodology used to determine energy performance for new buildings and major renovation projects in the LEED Green Building Rating System. The following is the preliminary ASHRAE 90.1 baseline building energy use intensity (site) as well as a comparison to the predicted energy use intensity of the design without contingency:

- Preliminary baseline building energy use intensity (site): 75 to 80 kbtu/sf/year
- Percent energy use reduction of design vs. baseline building: 58.8% to 61.4% reduction

Summary of Energy Model Inputs and Assumptions:

Project & Site Information	
Weather	Boston, MA – TMY3 format
Orientation	Plan North = Solar North

Geometry & Architecture	
Zoning	Per Architectural Sketch-Up Model
Gross Area	182,000 sq. ft. (incl. parking & void space) 162,400 sq. ft. conditioned (incl. void space) 159,000 sq. ft. conditioned (excl. void space)
Window-to-Wall Ratio (floor-to-floor)	South – 30% North – 35% East / West – 25%
Glass	South: 1"IGU Solarban 70XL Starphire/Starphire N/E/W: 1"IGU Solarban 60 Starphire/Clear
Overhangs	36" on south-facing windows (PV)
Floor to Floor Heights	▪ Level 00 – 14 ft ▪ Level 01, 02, 03 – 14.5 ft ▪ US Gym - 27.5 ft ▪ LS Gym – 22 ft ▪ Level 01 Vestibules - 29 ft
Walls	▪ Above Grade: R-20 continuous insul. ▪ Below Grade: R-10 continuous insul.
Slab-on-Grade	Existing: no insul.; New: R-10 vertically, 48" down
Roof	R-40 continuous insul.
Exposed Floors	R-30 batt
Infiltration	0.25 cfm / sf of perimeter wall area at test pressure 75Pa – modeled as 0.1 cfm/sf for average wind 10 mph

Internal Electrical Loads	
Lighting	Lighting power is drawn from targets established by Lam, as shown below: ▪ General Classroom – 0.8 W/sf ▪ Art, Science Classrooms – 1.0 W/sf

	▪ Learning Commons – 0.8 avg W/sf ▪ Auditorium General – 0.6 W/sf ▪ Music Practice – 0.8 W/sf ▪ Performing Arts – 1.0 W/sf ▪ Vo-tech – 1.0 W/sf ▪ Preschool – 0.8 W/sf ▪ Cafeteria – 0.8 W/sf ▪ Kitchen – 1.0 W/sf ▪ US Gym – 1.0 W/sf ▪ LS Gym – 0.7 W/sf ▪ Office – 1.0 W/sf ▪ Health - 1.2 W/sf ▪ Restrooms – 0.9 W/sf ▪ Corridor – 0.7 W/sf ▪ Storage – 0.7 W/sf ▪ Parking – 0.2 W/sf
Daylighting	▪ Full dimming control, down to full shutoff with no power draw. ▪ General Light target: 30 fc @ 2.5 ft AFF ▪ Gym Light Target: 20 fc @ 0 ft AFF
Specialty Lighting	Auditorium Stage Allowance – 15 kW
Elevators	25 kW total, include regenerative drive
Equipment (including diversity)	▪ Preschool – 1.2 W/sf ▪ LS Classroom – 0.4 W/sf ▪ US Classroom – 0.6 W/sf ▪ Science – 0.4 W/sf ▪ Art – 1.2 W/sf ▪ Music – 0.1 W/sf ▪ Learning Commons – 0.4 W/sf ▪ Gymnasiums – 1.4 W/sf (Events) ▪ Auditorium – 1.3 W/sf (Events) ▪ Cafeteria – 0.1 W/sf ▪ Kitchen – 7.7 W/sf ▪ Office – 1.2 W/sf ▪ Teacher Support – 7.8 W/sf ▪ Health – 0.2 W/sf ▪ Storage – 0 W/sf ▪ Corridor – 0.1 W/sf (Clearning) ▪ Restrooms – 0.2 W/sf ▪ Mechanical – 1.6 W/sf For more detail, refer to the breakdown of equipment

	in each space at the end of this narrative.

HVAC	
Thermostat Setpoints	76 / 70 occupied; 82 / 64 un-occupied; unoccupied mode on all holidays & breaks
Kitchen Ventilation	2,000 cfm hood exhaust and makeup air
Dishwasher Ventilation	1,000 cfm hood exhaust and makeup air
System	Geothermal Water-to-Air Heat Pumps
Geothermal Pumps	50 ft head, VSD
Geothermal Field	(150) 500 ft deep wells on 15 ft centers
Soil Properties	Siltstone, 1.1 Btu/hr/ft/deg F, 0.6 sf / day
Grout Conductivity	1.1 Btu/hr/ft/deg F.
Geothermal Fluid	20% Propylene Glycol
Large HP Fans (Gyms, Auditorium, Cafeteria)	Supply – 2.0 inches water TSP, variable speed Energy Recovery OA Fan – 1.0 inches water TSP Energy Recovery Exh Fan – 1.0 inches water TSP
Large HP Compressor	15.5 min EER; 3.5 min COP (Geo)
Large HP Energy Recovery	65% sensible and latent efficient, disabled when economizer active, modulates wheel speed for frost control
Large HP Economizers	Differential Enthalpy based, integrated w compressor control and ERV control.
Small HP Fan TSP (Classrooms)	0.5 inches water
Small HP Compressor	14.0 min EER; 3.3 min COP (Geo)
Dedicated Outdoor Air Systems	▪ (2) Geothermal Heat Pumps with Energy Rcvry ▪ Upper School unit also serves Art Class, Preschool, and Fitness – 12,500 cfm ▪ Lower School unit also serves Media Ctr, Servey – 12,500 cfm
DOAS Fans	Supply – 3.0 inches water TSP, Variable Speed Return – 1.5 inches water TSP, Variable Speed ERV OA – 1.0 inches water TSP ERV Exhaust – 1.0 inches water TSP
DOAS Compressor	14.0 min EER, 3.3 min COP
DOAS Energy Recovery	65% sensible and latent efficiency,

(non-kitchen vent)	differential enthalpy controller bypasses ERV during economizer conditions modulates wheel speed for frost control Max APD 1.0 inches
Demand Control Ventilation	On Fresh Air for all non-kitchen ventilation, based on zone CO2 sensors
Parking Exh Fans	▪ (4) staged fans with VSDs, 3,750 max cfm each ▪ Brake horsepower each - 1.26 hp ▪ controlled via CO and NOx from 1,500 cfm to 15,000 cfm total exhaust

Civil / Site Infrastructure & Process Loads	
Site Lighting	5 kW allowance
Dewatering + Ejector	0 kW allowance – assume gravity flow
Rain Cistern	5 kW allowance, 50 hours / month
Electric Fire Pump	75 hp, 2hrs / month

Domestic Hot Water	
General Usage	0.6 gal / person / day at 135 deg F as per 2011 ASHRAE Applications pg 50.14
Heaters	Storage, 90% Efficient NatGas
Dishwasher	Energy Star, conveyor type, 60 racks / day, 0.7 gal hot water per rack
Dishwasher Booster Heater	Electric booster heater, takes 42 gallons per day from 135 deg F to 180 deg F
Solar Thermal	Sufficient to address 50% of the annual DHW Load

Energy Modeling for NZE vs. LEED: Energy modeling for net zero energy projects is used for estimating energy use in order to size renewable energy systems. The modeling methodology is much more detailed and requires significantly more input and effort than the energy modeling approach used for LEED projects. Energy modeling for LEED projects is used to determine the relative performance of a building design compared to a hypothetical baseline building that just complies with the minimum requirements of the LEED reference standard for energy performance – "ASHRAE 90.1-2007 – Energy Standard for Buildings Except Low-Rise Residential Buildings". LEED energy modeling is used for comparison purposes and not for predicting or estimating actual energy use. Unless a LEED energy model is specifically developed with the purpose of estimating actual energy use, it should never be relied on as a predictor of energy use.

The specific methodology used for LEED energy modeling is the Performance Rating Method that is defined in Appendix G of the ASHRAE 90.1-2007 Standard. Appendix G provides a detailed modeling protocol to ensure compliance with the Standard. The LEED Green Building Rating system requires

additional procedures to be followed to ensure that there is consistency in how LEED buildings are modeled. The modeling protocols allow for the use of default schedules for building use and system operation that are not necessarily the same as real building operations and schedules. In addition, inputs for equipment and plug loads are typically based on assumptions rather than detailed knowledge about actual loads.